of caloric and of renewing the processes of secretion. In like manner the power of contraction, inherent in the muscular fibre, survives the destruction of both the sensorial and nervous powers, having an existence independent of either, although in the entire state of the functions they are subjected to the entire influence of both.

A difficulty here presents itself. If both the nervous and muscular powers be independent of the sensorial power, why, it may be asked, do the more perfect animals survive for so short a time the loss of the sensorial functions? This the author explains by the dependence of respiration on all the three powers,—the sensorial, nervous, and muscular, and its consequent cessation when either of these powers is withdrawn. In support of this view of the subject, he adduces various arguments to show that the muscles of respiration belong to the class of voluntary muscles, and that their action in performing that function is strictly voluntary, and the result of an impression made upon the sensorium by the want of fresh air in the lungs. These actions, though they have become automatic, are originally and essentially voluntary, and remain so even during apoplexy, as long as the breathing continues; but as soon as all sensibility is destroyed they necessarily cease, and death ensues. The phenomena are not explicable upon the hypothesis of a particular sympathy existing in the nerves distributed to the muscles subservient to respiration, and, if the above theory be adopted, require no other supposition for their explanation. As the organs supplied by the ganglionic nerves are subjected to the influence, not of any one but of every part of the brain and spinal cord, no inference respecting the sympathies of any of these nerves can be drawn, either from their particular origin or mode of distribution; and still less room can there be for such inferences in functions, where, as in respiration, the sensorial power is so materially concerned.

## *On the Respiration of Birds. By* William Allen *and* William Haseldine Pepys, *Esqrs. Fellows of the Royal Society.* Read April 30, 1829. [*Phil. Trans.* 1829, *p.* 279.]

The inquiries of the authors on human respiration, and on that of the guinea pig, and of which they communicated the details to the Royal Society in former papers, are here extended to the respiration of birds. Pigeons were the subjects of these experiments, and the same apparatus was employed as the one used for the guinea pig, described in the Philosophical Transactions for 1809.

The object of the first experiment was to ascertain the changes which take place in atmospheric air when breathed by a bird in the most natural manner. For this purpose a pigeon was placed in a glass vessel containing 62 cubic inches of air, and communicating with two gasometers, one of which supplied from time to time fresh quantities of air, and the other received portions which become vitiated by respiration. The experiment lasted 69 minutes, and was productive of no injury to the bird excepting a slight appearance of uneasi-

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ness whenever the supply of air was not sufficiently rapid. On examining the air at the end of the experiment, no alteration had taken place either in the total volume of air, or in the proportion of azote which it contained; the only perceptible change being the substitution of a certain quantity of carbonic acid for an equal volume of oxygen gas, amounting to about half a cubic inch per minute, and being equivalent to the addition of 96 grains of carbon in 24 hours.

Two experiments were made on the respiration of oxygen gas, obtained from chlorate of potash, and containing in the one case two, and in the other only one per cent. of azote. Under these circumstances it was found that the volume of the gas was unaltered, and that a similar quantity of oxygen gas had been abstracted, but that a much smaller quantity of carbonic acid had been formed than in the last experiment, the remaining portion being made up by azotic gas which had been given out from the lungs of the bird, and the volume of which was just equal to that of the oxygen absorbed. The bird was somewhat distressed during the experiment, but recovered immediately and perfectly on being released from its confinement.

In the fourth experiment, in which a pigeon was made to respire a mixture of oxygen and hydrogen, with a small proportion of azote, (the oxygen being in the same proportion as in common air,) it was found that there was no loss of oxygen; but that a quantity of hydrogen disappeared, and was replaced by an equal volume of azote. The authors observe that birds have a quicker circulation of blood than other animals; and also that they are more sensible to the stimulating effects of oxygen.

## *On the spontaneous Purification of Thames Water. By* John Bostock, *M.D. F.R.S. &c.* Read April 30, 1829. [*Phil. Trans.* 1829, *p.* 287.]

In the report which the author made of the result of his examination of Thames water to the Commissioners appointed by His Majesty to inquire into the supply of water in the metropolis, one of the specimens, taken near the King's Scholars' pond-sewer, was described as in a state of extreme impurity. The water had remained in the laboratory unattended to; but after an interval of some weeks it was observed to have become clear, while nearly the whole of the former sediment had risen to the surface, forming a stratum of half an inch in thickness, and still emitting a very offensive odour. In process of time this scum separated into large masses or flakes, with minute air-bubbles attached to them. At the end of two months longer these masses again subsided, leaving the fluid almost totally free from any visible extraneous matter. On analysis the water was found to contain lime, sulphuric and muriatic acids, and magnesia, in much larger quantities than in the specimens of Thames water previously examined, the proportion of saline matter being increased four-fold. The proportion of the muriates is nearly twelve times greater; that of carbonate of lime between two and three times, and that of sulphate of lime five and a half times greater. The water